

We claim:

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1. A method of identifying potentially fraudulent healthcare reimbursement claims, the method comprising:
    - determining a sequence of healthcare states for a client from healthcare reimbursement claims associated with the client;
    - determining a probability of the sequence based on previously determined probabilities of individual ones of the healthcare states; and
    - identifying the sequence as potentially fraudulent as a function of the probability of the sequence.
  2. A method of identifying potentially fraudulent or abusive healthcare reimbursement claims, the method comprising:
    - processing healthcare reimbursement claims for a population of clients and healthcare providers for a selected time interval to identify a total set of potential healthcare states;
    - for each healthcare state, determining a probability of the healthcare state as a function of the frequency of the healthcare state in the reimbursement claims;
    - selecting a client from the population of clients;
    - determining a sequence of healthcare states for the client from the healthcare reimbursement claims associated with the client;
    - determining a probability of the sequence; and
    - identifying the sequence as potentially fraudulent as a function of the probability of the sequence.
  3. A method for identifying potentially fraudulent or abusive treatment practices by healthcare providers, comprising:

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processing healthcare reimbursement claims for treatments provided by the providers, to determine transition probabilities for sequences of healthcare states for the treatments;  
for each provider, determining an aggregated transition probability for all sequences of healthcare states for treatments provided by the provider; and  
identifying as potentially fraudulent at least one provider having aggregated transition probability that is statistically different from the aggregate transition probabilities of similar providers.

4. The method of claim 3, wherein determining an aggregated transition probability for all sequences of healthcare states for treatment provided by the provider comprises:

for each client treated by a provider, determining a transition probability for each sequence of healthcare states including at least one treatment provided by the provider the client;  
determining the aggregated transition probability for the provider as a function of the transition probabilities determined for each sequence of each client.

5. The method of claim 4, wherein:

for each pair of states, there is a transition probability for a transition between the states; and  
the transition probability for a sequence of states is the geometric mean of the transition probabilities between each state and the next state in the sequence.

6. The method of claim 3, wherein the healthcare states are defined to be at least one of the group consisting of:  
procedure codes;

healthcare facilities; and  
individual healthcare providers.

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7. A method of identifying potentially fraudulent healthcare providers, the method comprising:

for each client in a population of clients, determining a transition probability for each sequence of healthcare states experienced by the client;  
for each provider, determining an aggregated transition probability as a function of the transition probability of each sequence of healthcare states of each client who experienced a healthcare state associated with the provider; and  
identifying as potentially fraudulent at least one provider having aggregated transition probability that is statistically different from the aggregate transition probability of similar providers.

8. A method for creating a model of healthcare states, comprising:

receiving healthcare reimbursement claims from a plurality of healthcare providers, each reimbursement claim related to a client and healthcare treatment;

for each client:

extracting from the claims related to the client a plurality of treatments;

determining at least one sequence of healthcare states from the treatments, each state associated with a provider;

for each pair of states in each sequence, updating a frequency count of a transition from a first state to a next state;

for each state, determining a total count of transitions from the state to all other states based on the frequency counts;

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for each state transition from a first state to a next state, determining a transition probability for the state transition as the ratio of the frequency count from the first state to the next state, to total count of transition for the first state to all other states.

9. A method of profiling healthcare entities, the method comprising:  
determining at least one sequence of healthcare states for an from healthcare reimbursement claims associated with the entity;  
determining a probability of each sequence based on previously determined probabilities of individual ones of the healthcare states; and  
assigning to a profile of the entity a transition metric based on the probability of each sequence.

10. The method of any of the foregoing claims, wherein the healthcare states are facilities providing procedures to clients.

11. The method of any of the foregoing claims, wherein the healthcare states are services codes for healthcare procedures.

12. The method of any of the foregoing claims, wherein the healthcare states are the healthcare providers.

13. The method of any of the foregoing claims, wherein the healthcare states are provider-days.

14. The method of any of the foregoing claims, wherein the healthcare states are provider-service codes.

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15. A system for creating models of healthcare claims, comprising:  
a database of healthcare claims, each claim including identification of a client, a provider, at least one procedure, and a date;  
a data processing module that processes a set of the claims into a date-ordered, entity specific sequences of states;  
a transition processing module that determines, from the date ordered entity specific sequences, a transition metric for each transition between states;  
an entity profiling module that generates profiles for at least one entity, a transition metric for one or more sequences of states related to the entity.

16. The system of claim 15, further comprising:  
an analytical module that receives the profiles and identifies entities that are potentially fraudulent or abusive based at least in part upon the transition metrics contained in the profiles.

17. The system of claim 16, wherein the analytical module includes a predictive model.

18. The system of claim 16, wherein the analytical module includes a rules based model.

19. The system of claim 15, wherein an entity is one of the group consisting of:  
a client;  
a healthcare provider;  
a provider/client; or  
a procedure.